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**AN ASSESSMENT OF OPPORTUNITIES FOR EXPANDING
THE GROOMED SNOWMOBILE TRAIL SYSTEM
ON THE
FLATHEAD NATIONAL FOREST**

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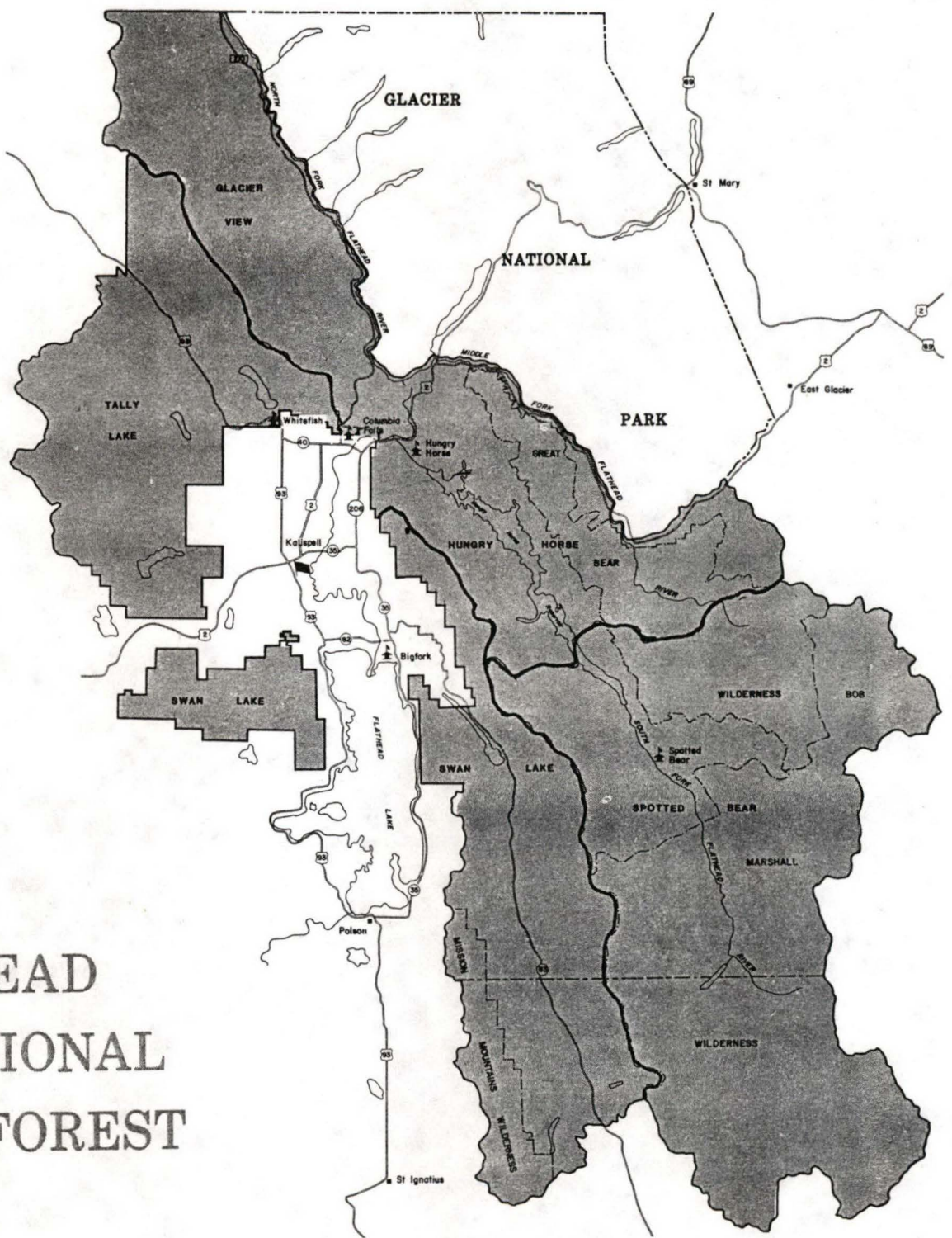
Title: An Assessment of Opportunities for Expanding the Groomed Snowmobile Trail System on the Flathead National Forest

Northern Region, Flathead National Forest

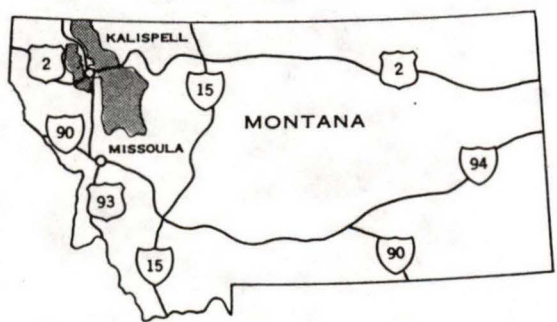
Abstract: Opportunities for expanding the groomed snowmobile trail system on the Flathead National Forest in northwest Montana were identified by reviewing Forest Plan management direction, assessing avalanche risk and incorporating suggestions of both resource managers and users. The Geographic Information System was used to model and display avalanche risk across the Forest.

The analysis identified an additional 559 miles of trail that could be developed under current Forest Plan Direction that would meet the needs of both managers and users and also avoid high-risk avalanche areas. It is recommended that the site-specific analysis, which will follow, be split into two parts. High priority trails (329 miles) on the Swan Lake, Spotted Bear, Hungry Horse and Glacier View Districts should be studied first. Study of lower priority routes on the Swan Lake and Tally Lake Districts should be deferred until demand and user interest increases.

This project is the first of three steps that will lead to expanded snowmobile recreation opportunities on the Forest. It will be followed by a technical report which will examine demand for snowmobile trail expansion and community infrastructure needs to support a snowmobile resort business. The final step will be to conduct a site-specific analysis of the opportunities identified in this project under the provisions of the National Environmental Protection Act (NEPA).



FLATHEAD NATIONAL FOREST



VICINITY MAP

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EXECUTIVE SUMMARY

Over the past three years the Flathead National Forest in northwest Montana has received numerous requests to expand the groomed snowmobile trail system on the Forest. Requests have come from local snowmobile clubs seeking to expand recreation opportunities as well as from the business communities seeking to diversify timber-based economies by utilizing non-traditional forest resources. To date, little action has been taken on these proposals because of other more pressing work priorities. The Forest Leadership Team did agree that analysis to expand the groomed snowmobile trail system needed to be undertaken on a Forest-wide basis. The Team also agreed that the analysis would consist of a two phase process:

1. A broad feasibility/National Forest Management Act (NFMA) assessment
2. A site-specific National Environmental Policy Act (NEPA) analysis of recommendations developed in phase 1.

The Columbia Falls Chamber of Commerce proposed a third phase to the process, a technical report examining the demand for snowmobile trail expansion and community infrastructure needs to support a destination snowmobile resort operation.

This project addresses the first phase of the process. It examines the opportunities for expanding the groomed snowmobile trail system based on the following considerations:

1. Compatibility with the Forest Land and Resources Management Plan
2. Avalanche risk on potential routes
3. User preferences for proposed routes

Under current Forest Plan management direction, 40% (939,360 acres) of the Forest is available for development of groomed snowmobile trails. Generally the Plan offers little specific direction to enhance or improve groomed snowmobile trail opportunities. Those lands suitable for trail development have key values that are compatible with motorized use, i.e., timber harvest with roads, semi-primitive motorized and roaded natural recreation opportunities, etc.

Sixty percent (1,390,362 acres) of the Forest is unsuitable for groomed trail development. In most cases language precluding trail development was fairly clear and straightforward. Areas where such use is unacceptable included designated wilderness, wild rivers, wildlife

winter ranges, some grizzly bear management areas, lands to be managed for primitive and semi-primitive non-motorized recreation, and other special management areas.

Proposed trails within the suitable land base were identified by local managers and evaluated by user groups. A total of 650 miles of trail were identified in this stage of the analysis. Organized user groups indicated a preference to develop trails in their own primary areas of interest. The highest priority was given to developing new routes on the Glacier View, Spotted Bear and Hungry Horse Districts. These are the areas that now receive the highest priority for grooming and they are, for the most part, in close proximity to Columbia Falls, the community most interested in attracting non-resident snowmobilers.

An avalanche risk assessment process was developed using the Geographic Information System (GIS). The system considered slope, elevation and vegetation in selecting those areas subject to high avalanche risk. Proposed trail routes were overlaid on avalanche risk maps. Approximately 38 miles of proposed trail were eliminated from further consideration when they were found to be within high-risk avalanche zones. These routes may be reconsidered at a later date if alternate routes can be found around critical slide paths, if field review shows that a hazard does not exist, or if the grooming operator agrees to undertake appropriate control work.

Of the remaining 622 miles of proposed trails, 53 miles were eliminated for other than avalanche reasons. Forty-five miles were eliminated because they would lead large numbers of snowmobiles very close to areas which are closed to snowmobile use. An additional eight miles of trail were eliminated because a portion of the route crossed corporate timber land where the owner has clearly stated such use is not acceptable.

It is recommended that the remaining 559 miles of proposed trail be considered for development. The Forest should pursue a site-specific (NEPA) analysis of the high priority routes on the Spotted Bear, Hungry Horse and Glacier View Districts and the Swan Unit of the Swan Lake District as rapidly as possible. This action has the potential to add 329 miles of groomed trail to the existing system in the near future. Further study of the lower priority routes on the Island Unit of the Swan Lake District and the Tally Lake District should be deferred to a later date.

I. INTRODUCTION AND PURPOSE

The Flathead Valley in northwest Montana, which includes the Flathead National Forest and Glacier National Park, has long been noted for its outstanding outdoor recreation opportunities. Land ownership in the valley is typical of many western mountain communities. The valley floor is generally in small private ownerships while the surrounding timbered slopes and mountain peaks are in large blocks of federal land. Seventy percent of Flathead County is under federal management. These federal lands, principally under the management of the U.S. Forest Service and the National Park Service, provide the land base for extensive outdoor recreation opportunities. They are supplemented in some areas by adjacent State and corporate forest lands (these lands account for 3.9% and 8.1 % of the Flathead County land base respectively).

Outdoor recreation has always been a factor in the local economy but the timber industry has been the dominant factor for many years. As the timber harvest has declined over the past 20 years, local communities have become more dependent on tourism to support their economies. Within the past 10 years the valley communities have undertaken a major effort to market their recreation resources on a national and international level.

Marketing efforts initially focused on traditional summer activities and established winter opportunities such as the Big Mountain Ski Area. Snowmobiling was viewed as an activity for local residents. The constant effort to broaden the base of the tourism industry has led to identification of new opportunities and development of expanded seasons of use. Three years ago the north valley city of Columbia Falls saw an opportunity to develop a destination-based snowmobile attraction centered on their community. The Chamber of Commerce and local snowmobile clubs approached individual Districts on the Flathead Forest with requests to expand groomed snowmobile trails in a variety of areas. Several individuals and businesses requested permits to conduct snowmobile outfitting operations on the Forest.

Currently, the Flathead Valley offers a network of about 185 miles of snowmobile trails in four locations. These trails are shown on Maps 2-7 and system mileages are summarized in Table 1. The trails are mostly located on National Forest land. They are groomed by local snowmobile clubs under a three-way agreement with the Forest Service and the Montana Department of Fish, Wildlife and Parks. The clubs groom trails on Forest Service land with funds provided by the Department of Fish, Wildlife and Parks. Grooming frequency ranges from twice weekly on popular routes to intermittent on less used trails.

The existing network of trails is not adequate to support a destination snowmobile attraction as envisioned by the Columbia Falls Chamber of Commerce. They see the need for a total

of 500-700 miles of groomed trails. A system of this size would allow visitors to stay in the area for five days and ride a new route of 100-150 miles each day. Most of the additional trails would need to be located on Forest Land. Glacier National Park is currently closed to all snowmobile use and is likely to remain so. State Forest land and corporate timber lands are too scattered and small in acreage to provide more than a small portion of the needs.

TABLE 1
Existing Groomed Snowmobile Trail System
Flathead National Forest

Area	District	Miles
Crane Mountain	Swan Lake	53
Desert Mountain	Hungry Horse	26
Skyland	Hungry Horse	39
Canyon Creek / Whitefish Divide	Glacier View / Tally Lake *	66
Total		184

* Includes mileage on the Stillwater State Forest

A major expansion of snowmobile opportunities on the Forest is expected to be highly controversial. As of this time, the Forest has not had the resources to develop a thorough analysis of the many proposals submitted. In the spring of 1991 a staff paper was presented to the Forest Leadership Team suggesting that the analysis for expanded snowmobile opportunities be conducted on a Forest-wide basis rather than District by District. It also suggested a two-tiered analysis process. The first step would be a broad overview/feasibility analysis under the provisions of the National Forest Management Act (NFMA) which would identify the best opportunities on the Forest. This overview would identify a proposed action that would be the subject of a site-specific National Environmental Policy Act (NEPA) analysis in the second step of the process. The Leadership Team adopted the recommendations for a Forest wide approach and a two-stage analysis. The project has remained on hold because of other work priorities.

The purpose of this project is to complete the first step of the process described above. This paper identifies the highest quality opportunities for expanding the groomed snowmobile trail system on the Flathead National Forest based on the following considerations:

1. Compatibility with the Forest Land and Resources Management Plan
2. Avalanche risk on potential routes
3. User preferences for potential routes

The project also documents issues and concerns relevant to the development of groomed snowmobile trails which are beyond the scope of this analysis. These issues and concerns will be carried forward into the site-specific (NEPA) analysis which will follow as the second step of the process.

The end product of this project, a series of recommendations on groomed snowmobile trail expansion, will be turned over to an interdisciplinary team which will complete the site-specific (NEPA) analysis.

II. LITERATURE REVIEW

A literature search was conducted using the resources of the Intermountain Forest and Range Experiment Station. The search focused on two areas, development of groomed trails and avalanche risk assessment, particularly any incorporating Geographic Information System (GIS) technology.

A substantial body of literature exists related to development of groomed trails. It ranges from trail standards to actual development of specific trail systems. Most of the work, however, is over ten years old. There does not appear to be any studies assessing snowmobile opportunities on a Forest-wide or comparable scale. Nor is there any information that might help in applying Forest Plan standards and guidelines to development of snowmobile trail systems. Many papers dealt with development of winter sports areas with more than one type of use. These tended to focus on identifying and managing conflict between different types of users, a subject not addressed by this project.

The search for information relating to avalanche risk assessment was not much more productive. Several papers have been developed in recent years which have tied the Geographic Information System with avalanches. For the most part efforts have focused on understanding avalanches and the physical conditions that create them rather than assessing avalanche risk. In 1988, a University of Nevada study by Nick C. Varnum investigated the use of the GIS to identify avalanche starting zones. He appears to have used the same variables as those identified independently in this project: vegetation, slope and elevation. He then plotted results at a 1:24,000 scale for use as a management tool for assessment of avalanche risk on a regional basis. This was the only work found tying GIS to avalanche risk over a large area.

III. METHODOLOGY

A. Study Area

The 2,329,722-acre Flathead National Forest, located in northwestern Montana, provides a wide variety of goods, services and amenity values. Terrain on the Forest is typically steep heavily timbered slopes, high rocky ridges and peaks, and narrow valley bottoms. In most areas, off-road vehicle travel with either conventional vehicles or over-snow vehicles is difficult or impossible.

The Forest's key values are timber, wildlife and recreation. According to current Forest Plan direction, the 835,747 acres of suitable timber lands are capable of producing an annual harvest of 100 MMBF, although this level has not been met in recent years.

The Forest provides habitat for a variety of wildlife species. Large game species include elk, mule deer, white tail deer, moose and black bear. The Forest is also home to several threatened and endangered species including the grizzly bear, bald eagle and gray wolf.

The Flathead Forest provides a wide variety of recreation opportunities. Well over one half of the Forest land base is dedicated to activities in the primitive and semi-primitive non-motorized end of the Recreation Opportunity Spectrum (ROS). 1,121,822 (47.7%) acres are designated wilderness, wild and scenic river, or hiking area. Another 171,802 acres (7.3%) are managed for primitive and semi-primitive non-motorized recreation opportunities without formal designation. The Forest Plan recommends that an additional 98,080 acres be included in the wilderness system. Congressional action may significantly increase this acreage. The Plan has designated substantial area as winter range for ungulate species. These ranges, located at lower elevations and on gentler slopes, are generally closed to motorized use during the winter.

The remainder of the Forest provides a variety of more developed recreation opportunities in settings ranging from semi-primitive motorized to roaded natural appearing. These include developed sites for camping and boat use, downhill and cross country skiing as well as motorized recreation opportunities such as driving for pleasure and snowmobiling. These opportunities are generally available in those portions of the Forest developed for timber production where wildlife security and habitat needs have not dictated that motorized use be restricted. The land base available for these activities is limited and declining. Steep heavily timbered land generally limits off-road vehicle opportunities, although snowmobile riders do have access to some high open ridges where motorized use is not presently restricted.

B. Determining Compatibility With the Forest Plan

The Forest Plan Management Area (MA) direction was reviewed to determine which land was suitable for groomed snowmobile trail development and which was not.

In many cases management intent was clear and straight forward. Some MA's contained specific legal requirements (wilderness) or management direction (wildlife winter ranges) that precluded development of groomed snowmobile trails. In other instances management direction specifically authorized snowmobile use.

In cases without specific language related to snowmobile activity, the Recreation Opportunity Spectrum (ROS) classification for the management area was used to determine suitability. Management areas with ROS classes of primitive and semi-primitive non-motorized were placed in the unsuitable category. All other ROS classes were deemed to be suitable for groomed trail development.

Some Management Areas lacked both specific guidelines and an ROS classification. In these instances key values were examined to determine suitability. For example, an area proposed for Research Natural Area designation was judged unsuitable.

Once the Forest had been divided into the suitable and unsuitable categories the Geographic Information System (GIS) was used to develop suitability maps and to calculate acreages. GIS layers necessary for this process were already in place.

C. Identifying Potential Routes

Potential routes were identified by District personnel most familiar with local snowmobile opportunities. Standards for routes were:

1. They had to fall within the land area suitable for groomed snowmobile trail development.
2. They were outside of known avalanche areas.

Other criteria considered in route identification included:

1. Proximity to other developed snowmobile trails and trailheads.

2. Potential for loop trips.
3. Potential for developing new trailheads.
4. Length of route.
5. Proximity to play areas or other attractions. (A play area is a large, generally open or sparsely forested area where snowmobiles can leave the trail and run with limited interference from terrain or vegetation.)
6. Proximity to closed areas where trail grooming could increase enforcement problems.

D. Identifying User Preference

After potential routes had been identified, they were presented to several representatives of organized snowmobile groups and interested individuals in a series of informal meetings. People were first asked to identify additional routes that had been missed in the initial mapping. They were then asked to give their preference for:

1. Geographic areas of the Forest to be emphasized for groomed trail development.
2. Specific routes to be developed.

This information was summarized and used to develop the final recommendations in this analysis.

E. Avalanche Risk

Avalanche risk was assessed using characteristics of slope elevation and crown cover. Areas at high risk had:

1. Slopes of 30-45°(58-100%)
Generally slopes under 30° are stable. On slopes over 45° the steep terrain will not allow enough snow to accumulate to pose a serious threat.
2. Elevations above 5,000 feet
In the Flathead area experience has shown that snowpacks below 5,000 feet are generally stable.

3. Bare slopes, brush fields or timber in the seedling/sapling class.

A moderate avalanche risk category was developed using the slope and elevation characteristics above but using a vegetation class which included pole, mature and old growth stands with less than 40% crown cover. The moderate risk category was not used in this assessment, but will be important in the site specific work that will follow.

Other factors considered but eliminated were land type and aspect. Aspect could become important if it became necessary to differentiate between winter and spring avalanche risk.

The criteria above were tested and verified in a small geographic area of the Forest where avalanche forecasters have had extensive experience in assessing snow conditions and avalanche risk. They seemed effective in identifying broad categories of risk.

Geographic Information System (GIS) layers were developed to model avalanche risk. Five primary GIS layers were used in the process. Four of them, the management area layer, stand structure layer, canopy closure layer and digital elevational model, already existed. The fifth, showing trail locations, was developed as a part of the mapping process. The primary layers were manipulated to create four secondary layers. One showed management areas suitable or not suitable for trail development. The others showed areas with high and moderate avalanche risk based on slope, elevation and vegetation type. These three secondary layers were combined to develop the layer depicting avalanche risk. The risk information was then combined with the suitable/non-suitable management area layer.

The GIS was used to compile avalanche risk maps for the Forest at a 1/2 inch to the mile scale. Potential routes were overlaid on these maps. In cases where high avalanche risk was obvious and extensive, routes were eliminated from further consideration. In cases where high risk was present, but appeared less extensive, the mapping process was repeated using a 1:24,000 map scale. A final determination was then made on whether to keep or eliminate the route.

Finally the avalanche risk, suitable/non-suitable management area and trail location layers were combined to produce the final maps.

It is important to note that this risk assessment is very broad in nature. It is used in this project to generally delineate areas of significant risk. It is not designed to answer the question, "Where and when will avalanches occur?" These questions can only be resolved in a detailed site-specific analysis of a proposed route.

The basic information gathered on avalanche risk may be expanded at some time into a more comprehensive tool for avalanche forecasting on the Forest.

F. Related Issues and Concerns Raised but Not Analyzed

During the development of this project several issues and concerns were identified that are related to expansion of groomed trail opportunities but are beyond the scope of this analysis. They were documented without further discussion, but they will be available for the site-specific (NEPA) analysis that will follow.

IV. ANALYSIS

A. Compatibility of Groomed Trail Development With the Forest Plan

The Flathead National Forest contains 2,329,722 acres of land. Based on management direction in the Forest Plan only, 40% (939,360 acres) of this land is available for development of groomed snowmobile trails. Sixty percent (1,390,362 acres) is unavailable for such use.

Lands unsuitable for groomed trail development are, for the most part, readily identifiable by specific management direction. The key values for which they are managed are incompatible with motorized/snowmobile use. These lands fall into several broad categories:

1. Specially designated areas with specific legal prohibitions against motorized use. These include the Bob Marshall, Great Bear and Mission Mountains Wildernesses, the Jewel Basin Hiking Area and the wild portions of the Flathead Wild and Scenic River.
2. Grizzly bear management areas where motorized use is specifically prohibited.
3. Areas managed exclusively for downhill or cross country ski use (Big Mountain, Essex and Round Meadows Ski Areas).
4. Deer and elk winter ranges and security areas.
5. Areas managed primarily for dispersed recreation within the primitive and semiprimitive non-motorized portion of the Recreation Opportunity Spectrum.

6. Lands recommended for wilderness designation in the Forest Plan that would have otherwise been suitable for groomed trail development.
7. Candidate Research Natural Areas.
8. Other special management areas where intensive motorized use would be inappropriate (Coram Experimental Forest, Condon Seed Production Area).

Categories 1-3 currently have Special Orders prohibiting snowmobile use. Categories 4 and 5 contain specific management direction to discourage motorized use and if necessary to prohibit it. Developing groomed trails in category 6 and 7 lands could jeopardize the eventual classification of these lands as wilderness or research natural areas. Intensive snowmobile use is incompatible with the research and seed production goals of the lands in category 8.

Table 2 shows the Management Areas and acreages on the Forest that are not suitable for groomed trail development. Appendix 1 displays acres of unsuitable land by District.

TABLE 2

**Management Areas Not Suitable for Groomed Trail Development
Flathead National Forest**

Management Areas	Acres	Comments
2	62,599	ROS primitive, manage for no motorized use
2A	107,203	ROS semi-primitive non-motorized, manage for non-motorized use
2D	526	ROS primitive, candidate research natural area
2E	184	ROS semi-primitive non-motorized, candidate research natural area
2F	260	ROS semi primitive non-motorized, candidate research natural area
3A	495	Candidate research natural area
9	18,812	Whitetail winter range, do not encourage winter rec, 12/1-5/15 road closures
9B	80	Whitetail winter range, candidate research natural area
10A	193	Condon seed production area
11A	27,476	Bunker Cr grizzly bear mgmt area, roads closed yearlong
11B	1,592	Candidate research natural area

Management Areas	Acres	Comments
12A	120	Swan River island, candidate research natural area
13	27,202	Elk/mule deer winter range, do not encourage winter rec, close roads 12/1-5/15
13A	13,176	Elk/mule deer winter range, do not encourage winter rec, close roads 12/1-5/15
13B	142	Elk/mule deer winter range, candidate research natural area
13C	738	Elk/mule deer winter range, do not encourage winter rec, close roads 12/1-5/15
13D	5,662	Elk/mule deer winter range, do not encourage winter rec, close roads 12/1-5/15
14	8,020	Coram Exp Forest, existing groomed trails OK, no expansion, no off trail use
15B	2,054	Essex/Round Meadows cross country ski areas
15E	8,900	Wildlife security area SB River area, roads closed 12/1-5/15
16B	312	Essex cross-country ski area
16C	443	Elk/mule deer security area, SB River road access closed 12/1-5/15
18	2,816	Wild River O/S Wild SPNM ROS
19	15,368	Jewel Basin Hiking area
20	3,574	Big Mtn area, existing access OK, no expansion
21	996,381	Bob Marshall/Great Bear Wilderness
22	73,573	Mission Mountain Wilderness
TOTAL	1,377,901	

The Forest Plan contains little management direction specific to enhancing snowmobile use. For the most part, lands suitable for groomed trail development have key values and management goals that are compatible with snowmobile use. The plan passively permits trail development rather than actively endorsing or promoting it.

The lands suitable for groomed trail development can be divided into several broad categories:

1. Lands with a primary or secondary goal of providing dispersed recreation within the semiprimitive motorized or roaded natural portion of the Recreation Opportunity Spectrum.

2. Riparian areas where over-snow use causes no physical impact on the ground.
3. Grizzly bear management areas that specifically allow or at least do not prohibit snowmobile use.
4. Scenic and recreational segments of the Flathead Wild and Scenic River and developed recreation sites.
5. Areas managed for dispersed recreation in an unroaded environment where motorized use is not prohibited or discouraged.
6. Areas without any direction relating to snowmobile use.

Table 3 shows Management Areas and acreages on the Forest that are suitable for groomed trail development. Appendix 1 displays acres of suitable land by District.

TABLE 3

**Management Areas Suitable for Groomed Trail Development
Flathead National Forest**

Management Areas	Total Acres	Acres Proposed for Wilderness	Available Acres	Comments
1	42,869	916	41,953	Generally acceptable, may be affected by adjacent MA direction
2B	118,709	9,054	109,655	ROS semi-primitive (motorized)
2C	8,934	0	8,934	ROS roaded natural, maintain trails, ROS motorized use
3	40,257	395	39,862	Snowmobile use OK provided amenity values are protected
4	314	0	314	Developed sites excluding Big Mtn Ski Area
5	3,753	0	3,753	ROS roaded natural
7	42,861	0	42,861	ROS roaded natural
7A	5,934	0	5,934	ROS roaded natural, enhance snowmobile opportunities
8	7,551	0	7,551	Permits dispersed rec in unroaded environment, trail OK
10	1,268	0	1,268	Admin site
11	69,812	0	69,812	Trail Cr grizzly bear mgmt area - open to snowmobile use
11C	9,852	0	9,852	Swan grizzly travel corridor, winter use appears OK

Management Areas	Total Acres	Acres Proposed for Wilderness	Available Acres	Comments
12	45,354	47	45,307	Riparian areas, snowmobile use OK on and off roads
15	492,704	983	491,721	ROS roaded natural, snowmobile use OK provided timber goals are met
15A	11,068	388	10,680	ROS roaded natural, snowmobile use OK provided timber goals are met
15C	8,166	0	8,166	ROS roaded natural, snowmobile use OK provided timber goals are met
15D	1,199	0	1,199	ROS roaded natural, snowmobile use OK provided timber goals are met
16	17,767	678	17,089	Timber mgmt w/out roads, no prohibition against snow trail, no surface disturbance
16A	1,722	0	1,722	Timber mgmt w/out roads, no prohibition against snow trail, no surface disturbance
17	10,705	0	10,705	Riparian areas, snowmobile use compatible
18	11,022	0	11,022	Split MA, W&S river o/s wilderness, wild river is semi-primitive non-motorized ROS, not available
TOTAL	951,821	12,461	939,360	

B. Identification of Potential Routes

Managers on each Ranger District were asked to identify potential routes on their units that would complement or expand the existing system of groomed trails. They generated four opportunities to expand and change existing systems and five opportunities for new trail networks. An overview of district proposals is as follows:

Swan Lake Managers identified opportunities for an additional 184 miles of trail in three geographic areas. There is a significant opportunity to expand the existing system on Crane Mountain. Some of these trails extend onto the Flathead Indian Reservation and would require coordination with tribal authorities before they could be developed. Others cross portions of the Swan River State Forest and would require coordination with the Department of State Lands. There is also an opportunity for a new trail system in the Island Unit west of Kalispell. Approximately one mile of trail is within white tail deer winter range (MA-9), an area that would normally not be suitable for groomed trail development. It was left in the proposal based on managers' belief that a short crossing of a corner of winter range would be acceptable to wildlife biologists. If this proves not to be the case, a portion of the trail can be eliminated. The final opportunity would be to develop a connector trail from the Crane Mountain area to a similar system located on the Seeley Lake District of the Lolo National Forest. This route would run the length of the Swan Valley and connect the communities of Big Fork, in the Flathead,

and Seeley Lake. This is the only trail identified that would connect two communities. It travels through an extensive area of intermingled ownership and would require careful coordination before it could be developed.

- Spotted Bear** Approximately 38 miles of potential trail were identified on the District. The central feature would be extension of the west side Hungry Horse Reservoir trail to the vicinity of the Spotted Bear Ranger Station. This would allow access to three resorts operated under Special Use Permits which are currently closed during the winter and early spring months. Grooming to the resorts would provide a unique recreation opportunity in the Flathead - destination resorts accessible only by snowmobile. Two of the resorts have indicated interest in operating during the winter months. The extension of the west side trail would also provide the opportunity to groom an additional short loop and trails to play areas.
- Hungry Horse** Managers identified approximately 115 miles of potential snowmobile routes. They included minor expansion of the existing Desert Mountain and Skyland trail systems. The primary opportunity identified was a new system extending groomed trails along the west side of Hungry Horse Reservoir with several short loops and groomed access to popular play areas. Many of the routes had been included in a grooming request submitted by the Flathead Snowmobile Association in previous years.
- Glacier View** Approximately 105 miles of potential trails were identified on the District. The routes would expand the existing Canyon Creek/Whitefish Divide system. They would also provide opportunities to route existing trails away from high-risk avalanche areas. The expanded system would extend as far north as Red Meadow Creek, offering longer loops and the opportunity for long one-way trips. A portion of one route is within elk/mule deer winter range (MA-13), an area where groomed trails would not normally be permitted. This segment was left in the proposal based on advice from managers who felt that wildlife biologists would accept a minor controlled encroachment in this area. If this proves not to be the case, the route can be eliminated from further consideration. This would result in the elimination of an additional 15 miles of trail on the District.
- Tally Lake** Managers identified a new opportunity for a major system with multiple entry points which would offer a variety of loops and longer one-way trips. Approximately 175 miles of new trail were identified in this network. This

represents the largest single opportunity to expand the groomed trail system on the Forest. A portion of the routes selected by managers had been proposed by members of the Ashley Lake Homeowners Association in previous years. Managers identified an eight-mile route on the west side of the District that would provide alternate access to the popular Summit House at the Big Mountain Ski Area. Approximately one mile of this trail is within MA-2A, an area where groomed trails would not normally be permitted. It was left in the proposal because managers felt the route was critical to alleviating a safety problem on another trail and because the road which it follows is open to motorized use in the snow-free season. Another portion of the trail is within the Big Mountain Ski Area (MA-20) where such trails are not normally permitted. In this case the ski area permittee has recognized and accepted the value of the trail and is in agreement with its development.

C. User Preference for Proposed Routes

After proposed routes were tentatively identified by district managers they were screened for compatibility with the Forest Plan. They were then presented to several snowmobile user groups who were asked to review the proposals for completeness and accuracy. The groups were also asked to indicate their preference for specific routes, i.e., which of the proposed routes they would like to see developed into groomed trails. The groups that participated are shown in Appendix 2. The purpose of the review was threefold:

1. To validate the routes
2. To identify areas in which there was little interest in developing groomed routes.
3. To develop some feeling for which areas should receive priority for development.

Those involved in the review process generally agreed that routes selected by managers were both viable and important to the snowmobile community. A few proposals were made to add routes on the Hungry Horse and Glacier View Districts (20 and 5 miles respectively), but in most cases, they were in areas where existing management direction or land ownership left little chance to develop snowmobiling opportunities. For example, one suggestion proposed developing a groomed trail on the east side of Hungry Horse Reservoir that would follow a single road for 20 miles through lands heavily restricted from snowmobile use and dead ending in another area closed to motorized use. These proposals were not eliminated from consideration. They are addressed later in the Summary and Recommendations. In a few instances, recommendations were made which were in conflict with Forest Plan direction. These routes were not carried forward in the analysis process.

User groups appear to be attempting to maximize the number of trails in the initial proposal to build "trading stock" for negotiations with other interest groups. They believe that the less important routes could then be traded off as concessions during the site-specific analysis that will follow.

Generally, groups put priority on developing trails in their own territories, although all saw advantages in increasing the overall system. The Flathead Snowmobile Association focused on the North Fork/Whitefish Divide area where they are grooming most actively. The Cut Bank Snowgoers were most interested in the Skyland area on the Hungry Horse District for which they have grooming responsibility. The South Fork Snowmobile Club would prefer to expand trails in the South Fork drainage where they hope to establish a grooming program. Representatives of the Columbia Falls Chamber of Commerce Snowmobile Committee favored placing priority on the North Fork/Whitefish Divide and the South Fork areas because these areas would provide the most economic benefit to the community.

The organized groups involved in the review showed less interest in areas on the Tally Lake and Swan Lake Districts, although they indicated they could be valuable if management decisions eliminated snowmobiling opportunities in more desirable areas. None of the groups were willing to eliminate these areas from further consideration.

The potential route through the Swan Valley that would connect the Crane Mountain Snowmobile Area with a similar area at Seeley Lake was recognized as a unique and desirable opportunity.

It should be recognized that this review involved only well organized, active snowmobiling organizations. There are definitely other informal groups and individuals with an interest in expanding snowmobile opportunities. They can be expected to provide another perspective during scoping for the site-specific analysis that will follow.

Initial proposals by both managers and users are shown on maps 2-7.

D. Avalanche Risk

The Geographic Information System (GIS) was used to map areas of high and moderate avalanche risk within the land base suitable for groomed snowmobile trail development. 23,614 acres of suitable land fell within the high-risk category. Trails within or in close proximity to high-risk areas were eliminated from further consideration. These routes may be given further consideration at a later date if alternate routes are found around critical slide areas, if field review indicates that a hazard does not actually exist, or if the grooming operator agrees to perform acceptable control work. A summary of high-risk areas by

District is given in Table 4. Proposed trails crossing lands with a moderate risk were left in the system. They will need careful review prior to approving actual trail development.

TABLE 4

**Acres of High-Risk Avalanche Areas Within Land Base Suitable for
Groomed Snowmobile Trail Development
Flathead National Forest**

District	Suitable Acres	High Risk Avalanche Acres
Swan Lake	204,578	4,645
Spotted Bear	92,641	3,868
Hungry Horse	175,101	4,480
Glacier View	259,663	10,429
Tally Lake	195,174	192

A review of proposed trails using a 1/2 inch to the mile avalanche risk map identified five proposed trail segments within the high-risk area. Four of these areas were on the Glacier View District in the North Fork of the Flathead. The fifth area was on the Hungry Horse District in the South Fork drainage. After discussion with district personnel, two areas in the North Fork and the one area in the South Fork were eliminated from further consideration. This resulted in a significant (38 mile) loss of proposed trail. It also eliminated an opportunity to connect existing trail systems and provide longer loops on the north end of the Glacier View District. The GIS was then used to generate site-specific 1:24,000 scale risk maps for a more detailed review of the remaining three areas. As a result of the second review the remaining routes were found to be outside of high-risk avalanche areas.

Avalanche risk areas are displayed on maps 2-7. It is important to note that the avalanche risk assessment in this project is very general in nature. It is intended to be used only in a broad planning context and not as a substitute for detailed field review prior to approving a specific route.

E. Related Issues and Concerns Raised but Not Analyzed

This analysis has focused on identification of new opportunities for groomed snowmobile trails that are compatible with Forest Plan direction, free of high avalanche risk and meeting user needs and preferences. During the analysis, several other relevant issues were identified that were outside the scope of this project. They are recorded here so they can be carried forward as the more detailed and site-specific analysis is undertaken. No attempt has been made to deal with these issues other than to record them.

1. How can groomed trail development and the need to conduct winter logging activities be managed to reduce conflict? Snowmobile trailheads and the lower elevation portions of groomed trails are often in areas where winter logging is practical and desirable from a resource or economic standpoint. As the groomed trails become an important economic factor to local communities and businesses, the potential for conflict will increase.
2. To what level should outfitted snowmobile operations be permitted on the Forest? Issues raised include: a) how will outfitter operations which depend on attracting large numbers of non-residents affect opportunities for resident snowmobilers, and b) what size operation (area, volume of use, etc.) is required for a viable outfitter business.
3. How can groomed trails be managed to minimize snowmobile impacts to adjacent sensitive areas and facilities? What level of monitoring and law enforcement is necessary to insure that areas such as wilderness, winter ranges, remote facilities, etc., are not impacted by development of groomed trails? This is of particular concern on the Spotted Bear District where facilities and critical winter ranges are extremely remote.
4. What are the site-specific avalanche risks on each proposed trail?
5. How have site-specific resource management decisions, generally not related to recreation activities, changed opportunities for groomed trail development since the Forest Plan was adopted? How will these types of decisions modify opportunities in the future?

V. SUMMARY AND RECOMMENDATIONS

The Flathead National Forest has the opportunity to significantly expand groomed snowmobile trails. This analysis indicates that there is a potential to add an additional 559

miles of trail to the existing system based on Forest Plan direction and preliminary assessment of avalanche risk. The site-specific (NEPA) analysis, which will follow this project, will undoubtedly reduce the total miles of trail to be considered for development. It should, however, provide a system that will expand recreational opportunities for both residents and non-residents. It should also provide a way for local communities to diversify their economies by providing services to those who are attracted to the area by an expanded snowmobile trail system.

This analysis identified approximately 650 miles of trail that could be developed under Forest Plan management direction. Of this total, 38 miles were eliminated from further consideration because they crossed areas of high avalanche risk. Another 45 miles were eliminated because they would bring many snowmobiles close to areas which are closed to snowmobile use. Finally, an eight mile segment of trail was eliminated because it crossed corporate timber lands where the owner has clearly stated that such use would not be acceptable. The 53 miles of trail eliminated for other than avalanche risk were all proposed during the public review. Table 5 displays this information for each District on the Forest.

TABLE 5

**Summary of Proposals for Groomed Trail Development
Flathead National Forest**

District	Proposed Miles	Eliminated (Avalanche Risk)	Eliminated (Other)	Proposed Further Study	Deferred
Swan Lake	184	0	0	124	60
Spotted Bear	38	0	13	25	0
Hungry Horse	135	6	32	97	0
Glacier View	110	32	8	70	0
Tally Lake	183	0	0	0	175
TOTAL	650	38	53	329	230

Over a period of years the Forest has developed a groomed snowmobile trail system of approximately 185 miles. This system is not adequate to support growing demands for expanded snowmobiling opportunities as evidenced by numerous requests for additional trails. Trailhead parking areas are filled to overflowing on weekends and popular routes are becoming crowded. Current users are primarily local residents. There are not enough trails

to accommodate a large influx of non-residents. The analysis of Forest Plan direction indicated that 40% of the Forest land base is available for development of groomed snowmobile trails. Most of the suitable land has not yet been utilized. Trail development has focused on the most desirable areas on the Swan Lake, Hungry Horse and Glacier View Districts. While there are places to expand on these Districts, the most significant opportunity for development is on the Tally Lake District. Although this District lacks the spectacular high elevation riding most in demand, it offers an extensive road network that could be groomed with a minimum of conflict with other resources. The Island unit of the Swan Lake District offers a similar but smaller untapped resource.

Two unique snowmobile opportunities were identified on the Forest. The first was the possibility of developing a connector trail through the Swan Valley that would link the Crane Mountain Snowmobile Area with a similar area on the Seeley Lake District of the Lolo National Forest some 25 air miles to the south. The second was to develop a trail along the west side of Hungry Horse Reservoir that would access three resorts operated under Special Use Permit near the remote Spotted Bear Ranger Station. The resorts are accessible only over snow during the winter months.

The opportunity exists on the Forest to develop a groomed trail network extensive enough to attract non-resident users to the area for week-long stays. Whether or not this opportunity is ever realized depends on local communities developing adequate infrastructure to serve the tourists during the winter. It also depends heavily on local groups greatly expanding their grooming capabilities. Such a system would, in the long run, be spread across the Forest rather than being focused on one community. Users would have to transport snowmobiles from one area to another by trailer to experience variety during their week-long stay. This analysis did not identify any opportunities that would allow users to travel from local communities to snowmobile areas on their snowmobiles. In all cases machines would have to be hauled from communities to trailheads.

The system developed to assess avalanche risk proved to be both effective and efficient. It allows a manager to make a quick estimate of risk without requiring an extensive amount of field time. Use of the 1/2 inch (1:126,720) scale mapping for first level review followed by use of 1:24,000 scale mapping to resolve uncertainties proved effective for a programmatic level of analysis. Use of a 1:24,000 mapping scale for a broad overview covering the entire Forest would have proven too time consuming and expensive. The time needed on GIS facilities would not have been available given other work priorities. When a site-specific analysis is undertaken, use of the 1:24,000 scale will be appropriate for making the first assessment of avalanche risk. This more detailed analysis will also require extensive field verification before routes are approved for development.

The review of Forest-wide opportunities to expand the groomed trail system by organized snowmobile groups was less productive than anticipated. The groups seemed unwilling or unable to focus on a Forest-wide approach. Their primary efforts were devoted to their own areas of operation or even to specific routes they favored. While they recognized that other areas were available, they showed little interest in actively pursuing them at this point. They did recognize that these areas may be important in the future, especially if use is further restricted in the more popular areas. No one wanted to remove these non-traditional areas from further consideration. They generally favored keeping options open but in reserve.

Based on this analysis it is recommended that the Forest actively pursue a site-specific (NEPA) analysis of the potential routes identified on the Spotted Bear, Hungry Horse, and Glacier View Districts and the Swan Unit of the Swan Lake District. Further study of the potential routes on the Tally Lake District and the Island Unit of the Swan Lake District should be deferred to a later date.

Splitting further analysis into two segments would allow the Forest to focus scarce resources on those areas that seem to be of primary importance to snowmobile groups. These areas all currently have some trails approved for grooming. Local snowmobile clubs have made at least some efforts to develop and maintain them in recent years. Eventual approval of trails in these areas would allow reasonable expansion of snowmobile opportunities in the near future. It is unlikely that local grooming efforts could be expanded rapidly enough to develop all potential routes identified in this analysis during the time (approximately 5 years) in which a decision would be valid. Under this scenario a maximum of 329 miles of new trail could be developed in the near future.

None of the organized groups who participated in this analysis indicated a strong desire to immediately expand groomed trails on the Tally Lake District or on the Island Unit of the Swan Lake District. They seemed to view these areas as a place to expand at some time in the future or as a place of last resort if snowmobilers are closed out of more desirable areas. Given the scarcity of resources, there is little purpose analyzing opportunities that are not in demand. Under current management direction, it is unlikely that snowmobiling opportunities in these areas will be changed significantly by other management decisions in the next five to ten years.

Any future analysis of groomed snowmobile trail opportunities should include a detailed assessment of avalanche risk on each selected route as well as a field review by a person well qualified in avalanche identification. The analysis should also address those issues and concerns raised but not analyzed in this project which relate to development of groomed trails (listed in Section IV,E).

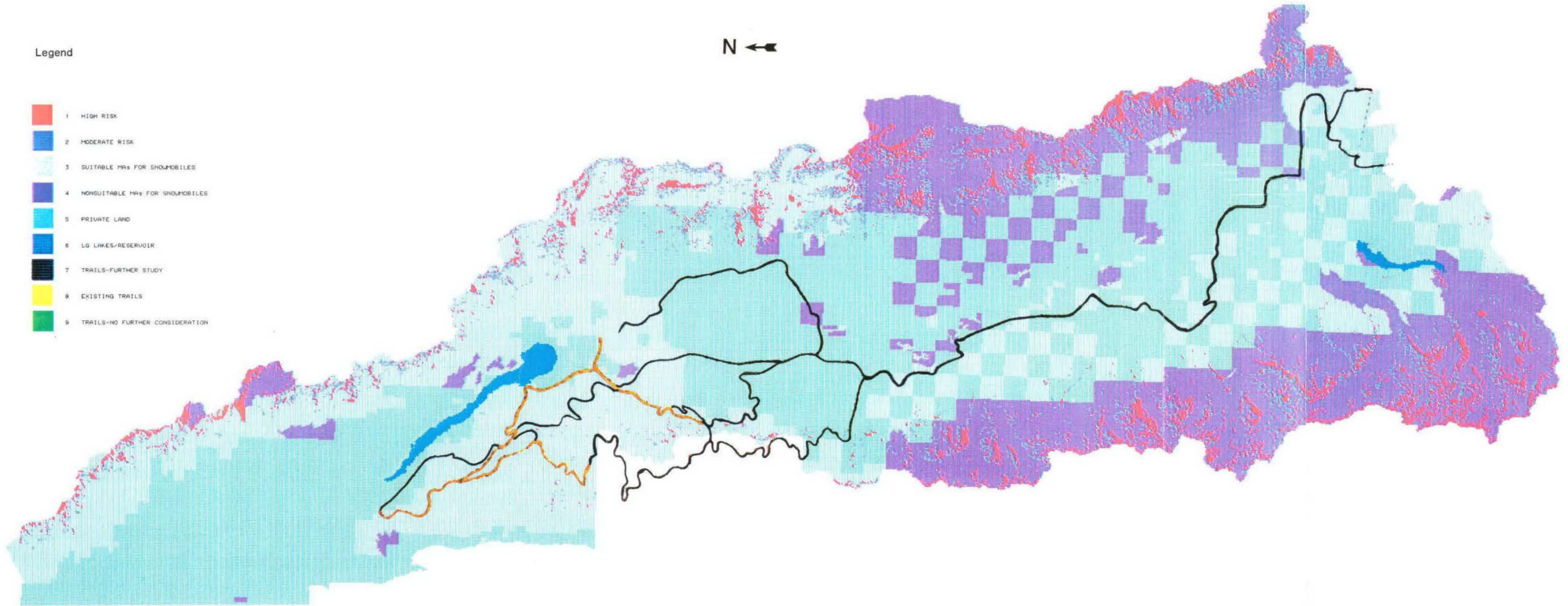
It is further recommended that a NEPA analysis be conducted to determine the level of snowmobile outfitter use that is acceptable on the Forest. There are several snowmobile outfitter proposals on hold pending decisions relating to development of groomed trails. If opportunities are limited, the analysis should determine how they will be allocated among interested parties. It appears that this analysis is related closely enough to the one described above that they could be accomplished concurrently, perhaps by the same team.

Swan Lake Ranger District: Swan Unit

Legend

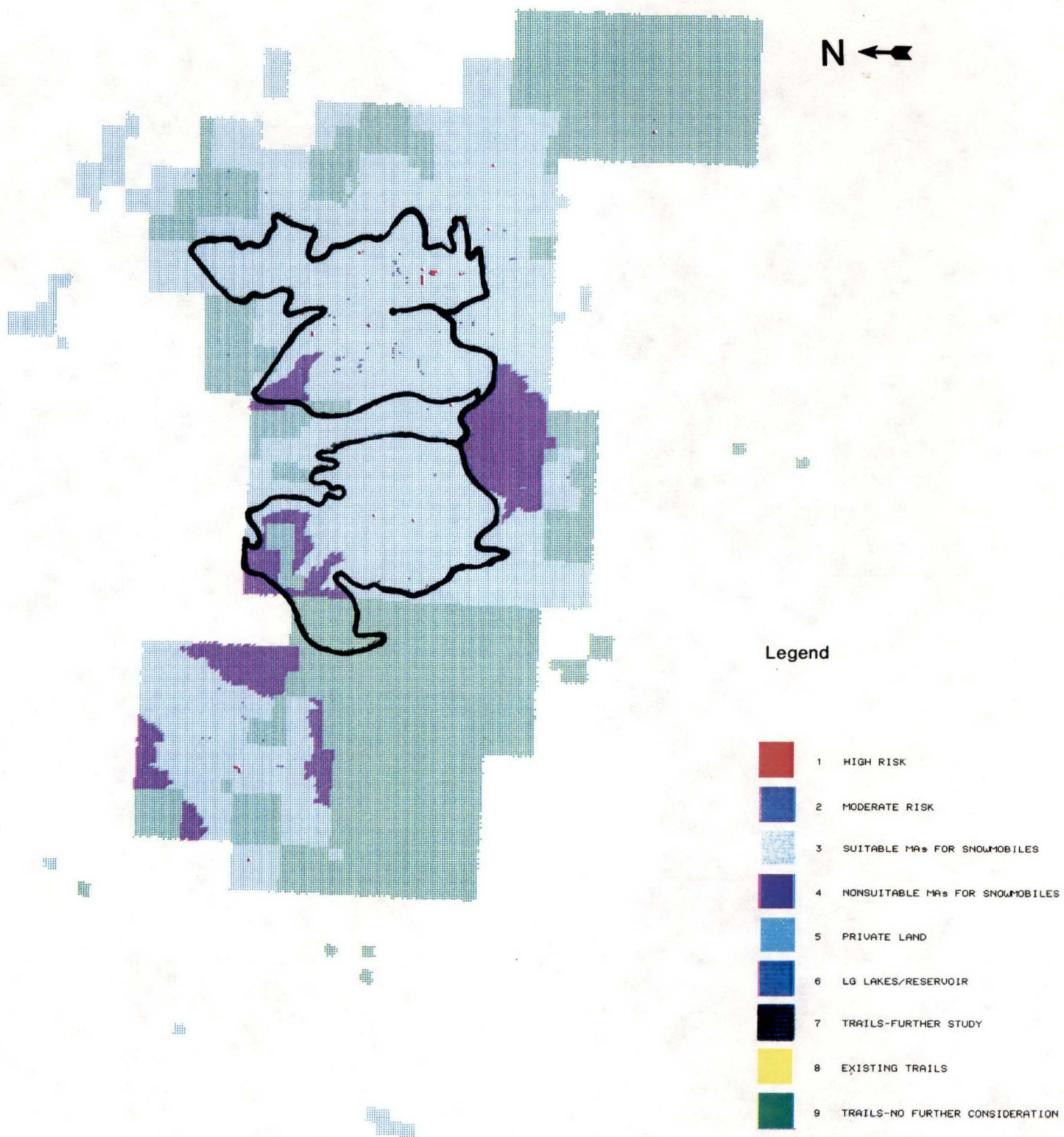
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- 2 MODERATE RISK
- 3 SUITABLE MAs FOR SNOWMOBILES
- 4 UNSUITABLE MAs FOR SNOWMOBILES
- 5 PRIVATE LAND
- 6 LG LAKES/RESERVOIR
- 7 TRAILS-FURTHER STUDY
- 8 EXISTING TRAILS
- 9 TRAILS-NO FURTHER CONSIDERATION

N ←



Scale 1:230,000

Swan Lake Ranger District: Swan Island Unit



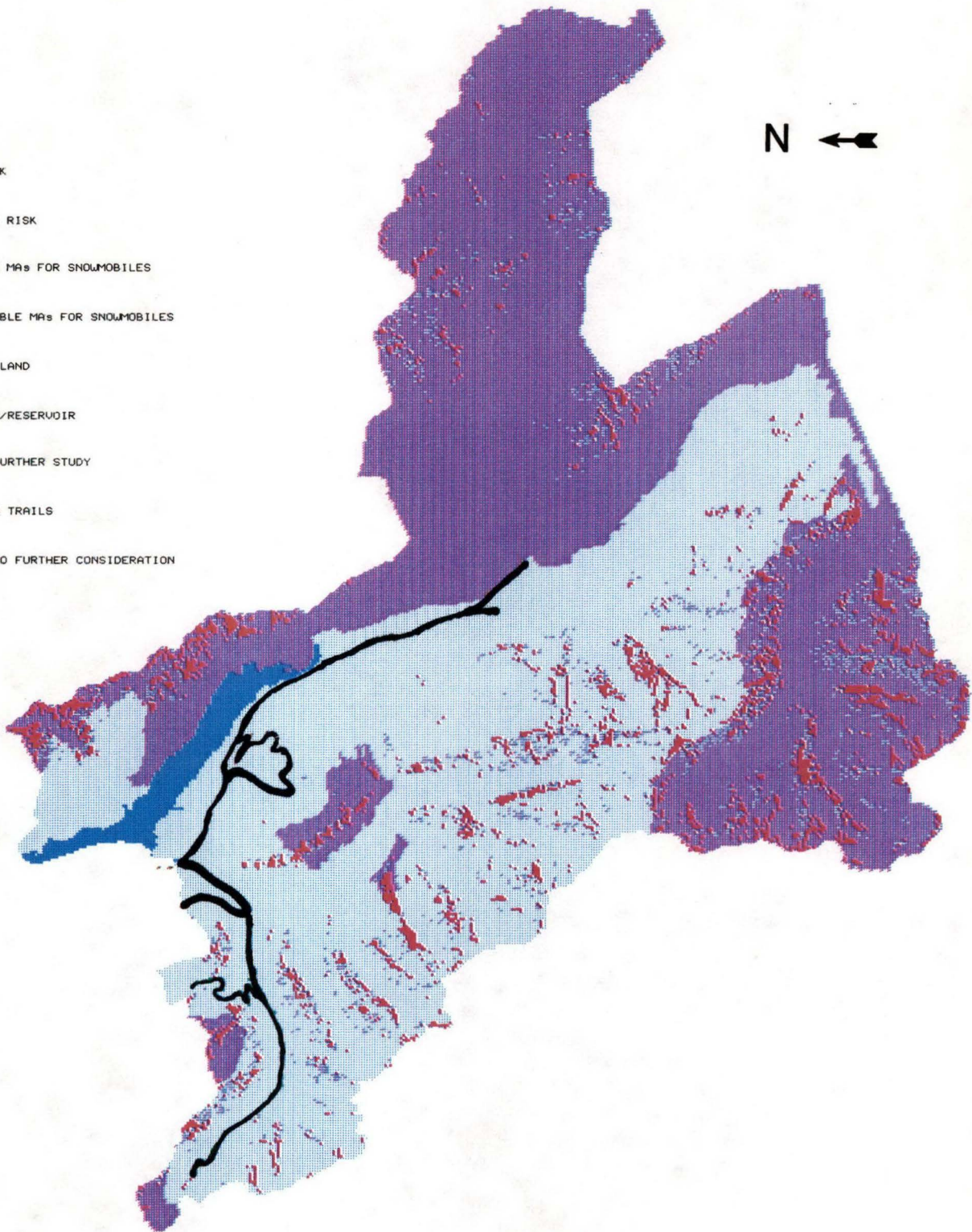
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Spotted Bear Ranger District: Outside of Wilderness

Legend

- 1 HIGH RISK
- 2 MODERATE RISK
- 3 SUITABLE MAs FOR SNOWMOBILES
- 4 NONSUITABLE MAs FOR SNOWMOBILES
- 5 PRIVATE LAND
- 6 LG LAKES/RESERVOIR
- 7 TRAILS-FURTHER STUDY
- 8 EXISTING TRAILS
- 9 TRAILS-NO FURTHER CONSIDERATION

N ←

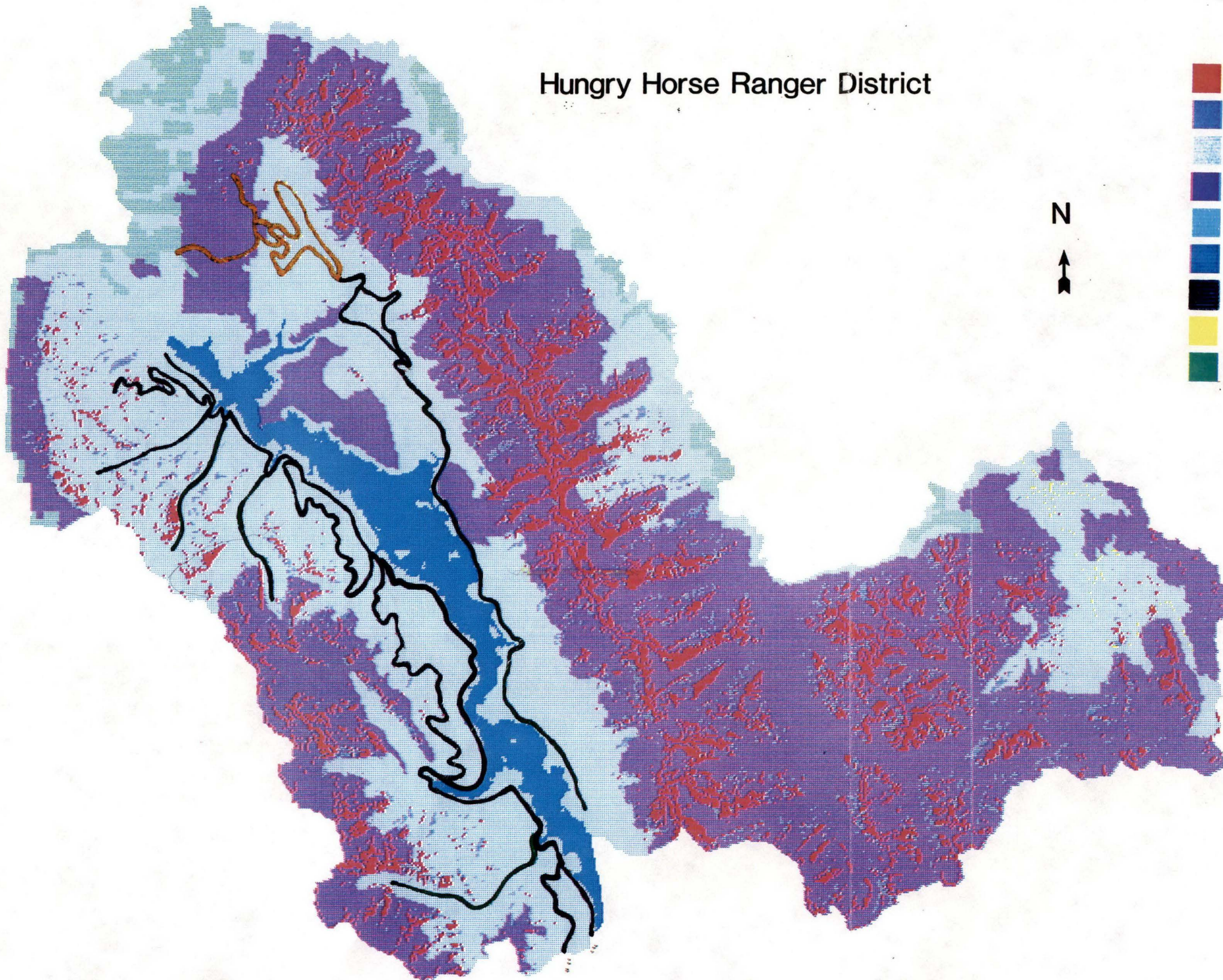


Scale 1:240,000

Hungry Horse Ranger District

Legend

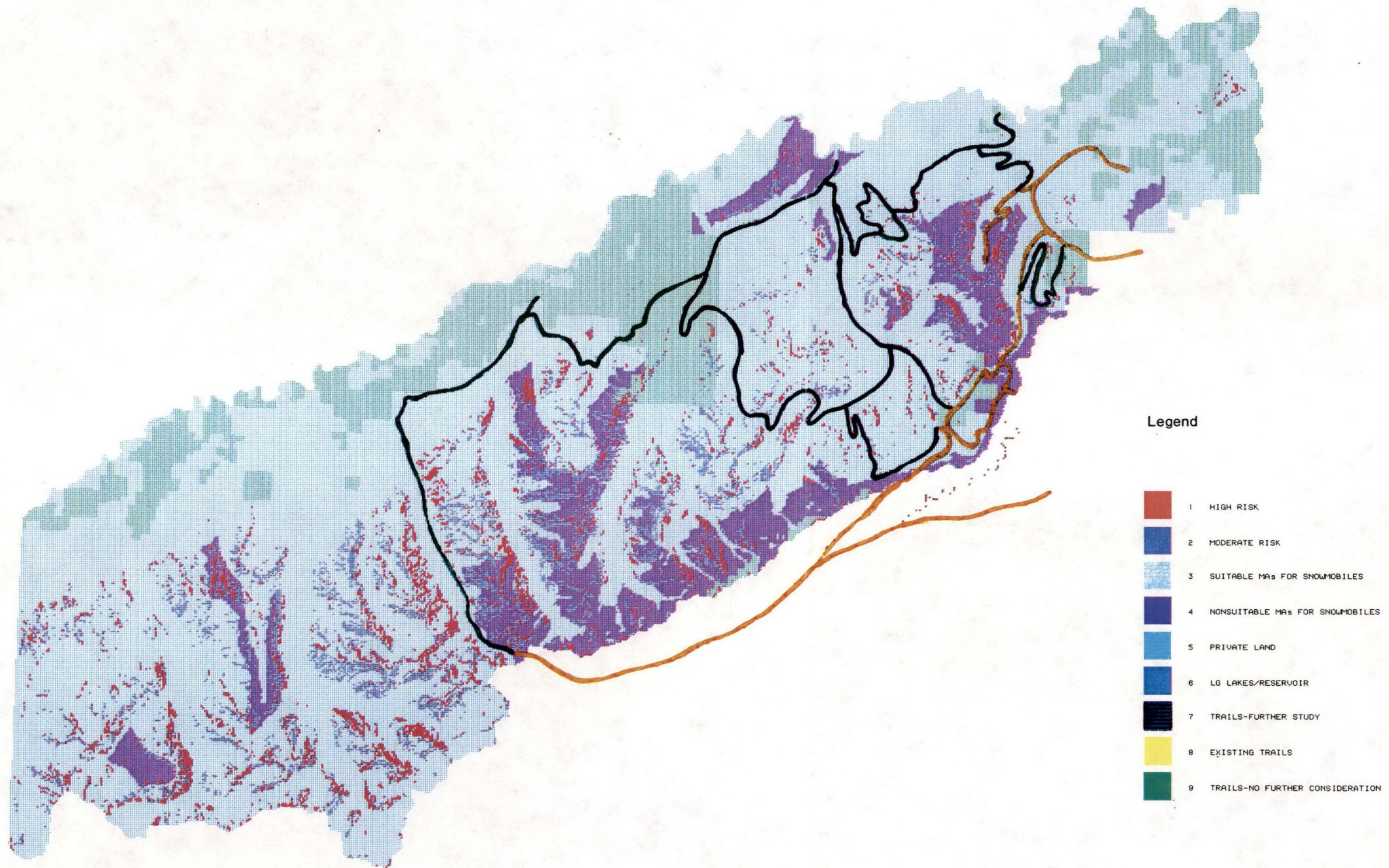
- 1 HIGH RISK
- 2 MODERATE RISK
- 3 SUITABLE MAs FOR SNOWMOBILES
- 4 NONSUITABLE MAs FOR SNOWMOBILES
- 5 PRIVATE LAND
- 6 LG LAKES/RESERVOIR
- 7 TRAILS-FURTHER STUDY
- 8 EXISTING TRAILS
- 9 TRAILS-NO FURTHER CONSIDERATION



Scale 1:250,000

Glacier View Ranger District

N ←



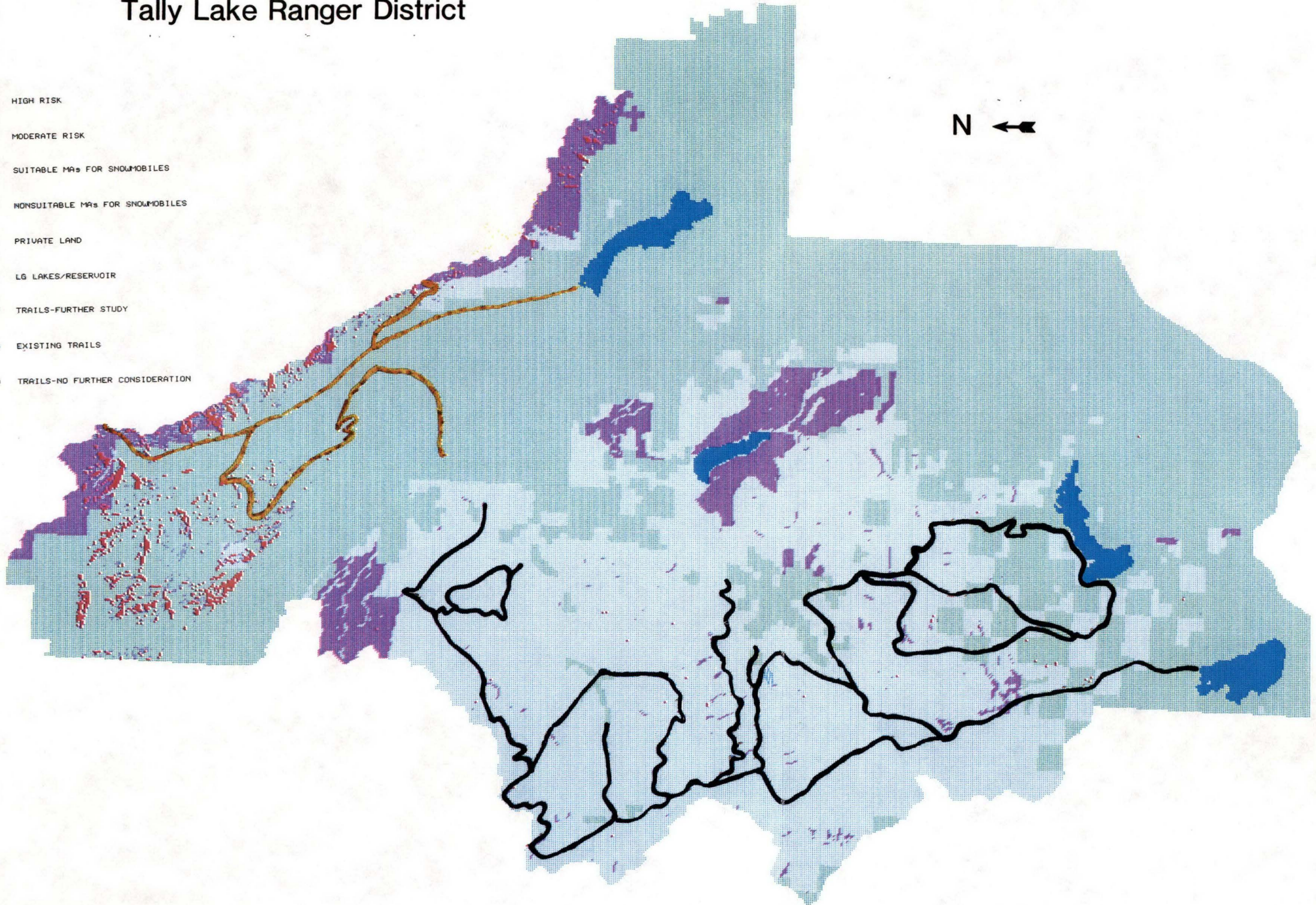
Scale 1:250,000

Legend

Tally Lake Ranger District

- 1 HIGH RISK
- 2 MODERATE RISK
- 3 SUITABLE MAs FOR SNOWMOBILES
- 4 NONSUITABLE MAs FOR SNOWMOBILES
- 5 PRIVATE LAND
- 6 LG LAKES/RESERVOIR
- 7 TRAILS-FURTHER STUDY
- 8 EXISTING TRAILS
- 9 TRAILS-NO FURTHER CONSIDERATION

N ←



Scale 1:270,000

VI. LITERATURE CITED

USDA-Forest Service, Flathead National Forest Land and Resources Management Plan, Kalispell, Montana, January 22, 1986

Varnum, Nick C., "Application of Geographical Systems Techniques to Assess Natural Hazards in the East-Central Sierra Nevada", University of Nevada, Reno, 1988.

VII. APPENDICES

- Appendix 1 Percent of Land Suitable/Unsuitable for Groomed Snowmobile Trail Development, by District
- Appendix 2 Groups Participating in Public Review
- Appendix 3 Trails Proposed for Further Study
- Appendix 4 Trails Eliminated from Further Study

APPENDIX 1

Percent of Land Suitable/Unsuitable for Groomed Snowmobile Trail Development by District

District	% Suitable	% Unsuitable
Swan Lake	57	43
Spotted Bear	9	91
Hungry Horse	43	57
Glacier View	71	29
Tally Lake	85	15

APPENDIX 2

Groups Participating in Public Review

South Fork Snowmobile Club

Flathead Snowmobile Association

Cut Bank Snowgoers Club

Columbia Falls Chamber of Commerce, Snowmobile Committee

APPENDIX 3

Trails Proposed for Further Study

District	Road #	From Rd #	To Road #
Swan Lake (Island Unit)*	917	2857	End
	917A	917	916
	916	917A	9858
	9858	916	2991
	2991	9858	2962
	2962	2991	2959
	2959	2962	Sec 8
	XC	2959	2957
	2957	Sec 8	917
	ORV Trail	917A	213
	213	ORV Trail	2988
	2988	213	2987
	2987	2988	ORV Trail
	ORV Trail	2987	917A
Swan Lake (Swan Unit)	9796	10212	9714
	9714	9796	9711
	9711	9714	948
	9713	9714	888
	888	9713	903
	903	888	10291
	10291	903	9591
	9591	10291	561
	561	9591	Hwy 89
	Hwy 89	561	Hwy 44
	Hwy 44	Hwy 89	9558
	9558	Hwy 44	Hwy 89
	Spur Sec 8	Hwy 89	SL Dist
	9814	9558	10567
	10567	9814	SL Dist
	9817	498	Flt. Res.
	Flt. Res	9817	S. Wood.
	S. Wood	Flt. Res.	888
	9818	10229	10229
	10229	9818	10532
	10532	10229	888
	554	Hwy 89	9523
	9523	554	9519
	9519	9523	Hwy 89
Spotted Bear	895	HH Dist	End

District	Road #	From Rd #	To Road #
	2825	895	Sec 12
	38	895	SBRS
	2831	895	895
	381	895	1634
	1634	381	HH Dist
Hungry Horse	895	HH Dam	SB Dist
	895H	895	End
	895A	895	1602
	1602	895A	End
	2817	895	1633
	1633	2817	895
	1605	895	895D
	895D	1605	9796
	9796	895D	895
	1634	895	SB Dist
	1048	1614	38
	38	1048	1618
	168	38	1048
	XC	1653	C. Div
Glacier View	803	NFK	5295
	5295	803	Sec 33
	XC	5295	1694
	1694	Sec 33	803
	803	1694	316
	5271	803	316B
	316	317	Sec 11
	XC	Sec 11	1696
	317	NFK	1693
	1693	317	1691
	1691	1693	End
	XC	1691	5207
	5207	Sec 13	315
	315	5207	316
	1655	315	316
Tally Lake*	912	Ashley Lk	9612
	9612	912	5395
	5395	9612	End
	XC	5395	2942
	2942	Sec 12	11258
	11258	2942	Sec 28
	XC	Sec 28	10236
	10236	Sec 33	912
	538	Little Bitterroot Lk	113
	113	538	538B
	538B	113	538

District	Road #	From Rd #	To Road #
	978A	538	313
	313	9784	9763
	9763	313	End
	XC	9763	10239
	2890	113	60
	2908	2890	113
	60	2890	Sec 9
	60A	60	60
	2883	2890	9806
	9806	2883	2881
	2881	9806	60C
	60C	2881	60
	2880	606	910
	910	2880	60
	2875	910	60
	2807	2875	2875
	9790	Start	Sec 27
	XC	Sec 27	316

* Study Deferred

XC - Cross Country Route Off System Road

APPENDIX 4

Trails Eliminated From Further Study

District	Road #	From Road	To Road	Reason
Spotted Bear	381	895	End	P
	1612	381	End	P
Hungry Horse	895B	895	End	A
	895C	895	5339	P
	5339	895C	End	P
	895F	895	End	P
	38	1048	2839	P
Glacier View	909	317	376	A
	376	909	1685	A
	1685	376	115	A
	115	376	Red Meadows Lk	A
	803	5295	1694	A
	316C	9848	5303	O
	5303	316C	End	O
	XC	5303	1698	O
	1698	End	316	O

A = Avalanche

O = Ownership Conflict

P = Proximity to Closed Area

XC = Cross Country Route off System Road